REMARKS/ARGUMENTS

The Office Action mailed December 15, 2004 has been reviewed and carefully considered. Claims 2-4, 6-7, 12-14, 16-17, 25-26, 28-30, 32-33, 37, 39-40, 43-45, and 47-48 are canceled. Claims 1, 5, 8-9, 11, 15, 18-22, 24, 27, 36, 38, and 41-42 have been amended. Claims 51-54 are added. Claims 1, 5, 8-11, 15, 18-24, 27, 31, 34-36, 38, 41-42, 46, 49-54 are pending in this application, with claims 1, 5, 11, and 15 being the only independent claims. Reconsideration of the above-identified application, as herein amended and in view of the following remarks, is respectfully requested.

In the Office Action mailed December 15, 2004, the specification is objected to because of informalities listed by the Examiner. The specification is amended to address each of the informalities noted by the Examiner. In view of the amendments, the objection to the specification should now be withdrawn.

Claims 4-5 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Claim is canceled. The limitations of claim 4 are now incorporated in independent claim 1. The amended independent claim 1 contains proper antecedent basis for the term "acknowledgement message". Claim 5 is rewritten as an independent claim and to clearly recite that the transmission rate of acknowledgement messages is changed in response to retransmission of negatively acknowledged data unit.

Claims 8, 22, 18, 36, 9, 23-27, 19, 37-41, and 21-43-50 stand rejected under 35 U.S.C. §112, second paragraph as being indefinite because they include lists which the Examiner alleges are unclear because it is not clear whether the claim requires one of the items in the list or at one of the items in the list. Each instance of "and/or" and "and" in the lists is replaced by --or-- for consistency and to clarify that at least one of the items in the list is required.

Claims 1, 2, 5, 11, 12, and 15 stand rejected under 35 U.S.C. §103 as obvious over U.S. Patent No. 5,477,550 (Crisler) in view of TCP/IP Illustrated (Stevens).

Claims 3-4, 6-9, 13-14, 16-20, 22-27, and 36-42 stand rejected under 35 U.S.C. §103 as unpatentable over Crisler and Stevens in view of EP 0 695 053 (Ayanoglu).

Claims 10, 21, and 43 stand rejected under 35 U.S.C. §103 as unpatentable over Crisler and Stevens and further in view of U.S. Patent No. 6,359,877 (Rathonyi).

Claims 28-35 and 44-50 stand rejected under 35 U.S.C. §103 as unpatentable over Crisler, Stevens, and Ayanoglu further in view of Rathonyi.

Before discussing the cited prior art and the Examiner's rejections of the claims in view of that art, a brief summary of the present invention is appropriate. The present invention relates to an error control method and apparatus for a transmission channel. Each endpoint of the transmission channel includes a receiver and a transmitter (see page 9 lines 8-11). Each receiver includes a receive window defined so that the oldest packet not received and the sequence number of the next data block expected to be received is less than or equal to the window size (page 9, lines 11-17). Similarly, each transmitter has a transmit window defined so that the difference between the sequence number of the oldest data block not positively acknowledged and the sequence number of the next data block to be transmitted in less than or equal to the window size (page 9, lines 21-26). Accordingly to the invention, the rate of transmitting acknowledgement messages is changed on the basis of the transmission quality, i.e., based on the packet erasure rate (PER) (see page 11, lines 16-23).

Fig. 1 and Fig. 2 are used to describe receiver side error control. According to this embodiment, when an error detector 11 indicates successful receipt of a data block, a packet counter value is incremented by 1 (page 1, line 30 to page 14, line 3). If a data block is not successfully

received, the packet counter value is increased by 1+W (page 14, lines 3-8). When the counter value reaches a threshold, an acknowledgment is sent (page 14, lines 10-15). Therefore, when quality is poor (i.e., when there are a large amount of unsuccessful receipts of data blocks), acknowledgement messages are sent more frequently (p. 18, lines 10-15) because the counter value increases at a faster rate than if successful receipts of data blocks are made.

Figs. 3-4 describe a similar configuration for a transmission side error control. When a negatively acknowledged data packet is retransmitted, a packet counter is increased by 1+W. When an unacknowledged data packet is transmitted, the packet counter is increased by 1. When the packet counter exceeds a threshold, the receiver is pulled to send an acknowledgment message (page 17, lines 12-18).

The claims are rewritten to include two independent method claims and two independent apparatus claims. Independent claims 1 includes the limitations of original claims 1-4, wherein the limitations of claims 3 and 4 are written alternatively. Independent claims 5 includes original claims 1 and 5-7. Independent claim 11 includes the limitations of original claims 11-14, and independent claim 15 includes the limitations of 11 and 15-17.

Independent claims 1 and 11 clearly recite changing the transmission rate in response to detection of a data unit erasure or loss and includes "counting the number of data units that have been successfully received", "transmitting an acknowledgement message when said count value exceeds a predetermined threshold value", and "one of increasing the count value by a predetermined value and decreasing said predetermined threshold value when a data unit erasure or loss is detected".

Neither Crisler, Stevens, nor Ayanoglu disclose changing the trasmission rate in response to detection of a data unit erasure or loss. Crisler discloses a method for

communicating data using a modified selective repeat automatic repeat-request (SR-ARQ) protocol. Fig. 5 of Crisler discloses a procedure for reception of messages at a data unit, wherein the data unit is a data terminal (see col. 3, lines 25-27 and col. 4, lines 23-24 of Crisler). After a message (which includes a plurality of blocks) is received, each of the blocks of the message is error checked to determine which blocks are correctly received. If no errors are detected, a message received communication is transmitted (col. 4, lines 30-33). If errors are detected, a message partially-received communication is transmitted (col. 4, lines 35-37). The message-received and the message-partially-received communications are collectively termed transmission acknowledgements (col. 4, lines 44-45). Since the transmission acknowledgement in Crisler is determined and sent after each message is received, Crisler fails to teach or suggest changing the transmission rate in response to detection of a data unit erasure or loss, as expressly recited in independent claims 1 and 11.

Stevens fails to teach or suggest what Crisler lacks. As indicated by the Examiner, Steven states in the second paragraph of section 20.6 that "the rate at which new packets should be injected into the network is the rate at which acknowledgements are returned by the other end". This sentence in Stevens merely indicates that the rate of transmission of packets should be same rate at which the receiver acknowledges packets. The sentence does not state or imply that the rate of acknowledgement changes based on the detection or data unit erasure or loss. In fact, there is no indication that the rate of acknowledgement changes at all.

Ayanoglu discloses an asymmetric protocol for wireless communication. Fig. 3 of Ayanoglu discloses a steps executed by a cellular computing device for data transfer from the cellular computing device to a base station. At step 303, the cellular computing device 10 waits to receive data messages from either the laptop computer 101 or from base station 121 (see col. 9, lines

3-5 of Ayanoglu). Three types of messages are possible: user-data messages from the laptop computer, requests for retransmission signaling messages from the base station, and acknowledgement of packet reception (col. 9, lines 6-11). A counter threshold defines the maximum number of packets that can be stored in a buffer (col. 6, lines 24-26). The cellular computing device 10 continuously transmits packets until the counter exceeds the threshold (col. 6, lines 21-24). When an acknowledgement message is received from the base station, the window is slid and the counter is decremented by the number of acknowledged patents (col. 6, lines 31-37). There is no teaching or suggestion that the rate of acknowledgements is changed based on packet loss or erasure.

Accordingly, neither Crisler, Stevens, nor Ayanoglu disclose, teach or suggest "changing the trasmission rate in response to detection of a data unit erasure or loss". In view of the above amendments and remarks, it is respectfully submitted that independent claims 1 and 11 are allowable over Crisler, Stevens and Ayanoglu.

Independent claims 5 and 15 each recite "changing said transmission rate of said acknowledgment messages is changed in dependence on a retransmission of a negatively acknowledged data unit", "counting the number of data units that have been successfully received", "polling for a transmission of an acknowledgement message when said count value exceeds a predetermined threshold value", and "one of increasing the count value by a predetermined value and decreasing said predetermined threshold value when a negatively acknowledged data unit has been retransmitted".

It is respectfully submitted that independent claims 5 and 15 are allowable because neither Crisler, Stevens, Ayanoglu, nor the combine teaching thereof disclose, teach or

suggest "changing said transmission rate of said acknowledgment messages in dependence on a retransmission of a negatively acknowledged data unit".

As stated above, Crisler discloses that a transmission acknowledgement is determined and sent after each message is received. Accordingly, Crisler fails to disclose, teach or suggest changing the rate of acknowledgement messages.

Stevens also fails to teach or suggest this limitation. Stevens discloses that "the rate at which new packets should be injected into the network is the rate at which acknowledgements are returned by the other end". As stated above, this sentence merely states that the rate of transmission of packets should equal the rate at which they are acknowledged. It does not state that the rate of acknowledgement changes based on a retransmission of a negatively acknowledged data unit, as expressly recited in independent claims 5 and 15.

Ayanoglu also fails to teach this limitation. Ayanoglu discloses specific steps to be taken when a retransmission request is received including checking that the round trip time is not exceeded (see col. 9, line 38 - col. 10, line 8 of Ayanoglu). There is no disclosure, teaching or suggestion for "changing said transmission rate of said acknowledgment messages in dependence on a retransmission of a negatively acknowledged data unit". In view of the above amendments and remarks, it is respectfully submitted that independent claims 5 and 15 are allowable over Crisler, Stevens, and Ayanoglu.

Dependent claims 8-10, 18-24, 27, 31, 34-36, 38, 41-42, 46, and 49-54, each being dependent on one of independent claims 1, 5, 11, and 15, are deemed allowable for at least the same reasons expressed above with respect to independent claims 1, 5, 11, and 15.

New dependent claims 51-54 are added to recite that the predetermined value by which the counter value is incremented when a data unit erasure or loss is detected or when a

retransmission of a negatively acknowledged data unit is detected is one. Support for this limitation is found on page 12, lines 29-34). None of the prior art of record discloses this limitation.

The application is now deemed to be in condition for allowance and notice to that effect is solicited.

A check including the amount $200.00 is enclosed in payment for the addition of 1 independent claim in excess of three.

Respectfully submitted,

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